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Access and utilization of financial services among poor HIV-impacted children and families in Uganda

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ABSTRACT

With high prevalence of both poverty and HIV, Sub-Saharan Africa (SSA) has one of the highest numbers of unbanked individuals and families. Although the use of savings products to promote financial inclusion among poor individuals and families has increasingly become more important to policy makers in SSA, limited research exists about the mechanisms and relative importance of institutional and individual-level factors associated with access and utilization of financial services. Using survey data and administrative bank records from a randomized controlled trial in southwestern Uganda, we find that given an opportunity, poor HIV-impacted families and individuals can engage with financial institutions and accumulate savings. Additionally, individual-level factors (e.g., household wealth, child poverty, child work, and attitudes towards savings) were significantly associated with three of the eight outcomes (i.e. saved any money, average monthly total savings, and total number of deposits). Furthermore, institutional-level factors (e.g., access and proximity to the bank, matching incentive rate, and financial education) were associated with all the eight outcomes included in the analysis. Our findings indicate that poor HIV-impacted families can engage with financial institutions and save for their children, if opportunities and institutional arrangements are in place. Findings have implications for financial inclusion policy and programming that target vulnerable youth and families to engage with financial institutions and accumulate savings.

1. Introduction

Financial inclusion is considered one of the building blocks for poverty reduction and economic growth. The World Bank defined (2019) financial inclusion as the extent to which individuals and businesses have access to useful and affordable financial products and services (such as savings, credit, insurance, and other related transactions and payments) that meet their needs and are delivered in a responsible and sustainable way. Growing evidence indicates that access to appropriate financial services plays a significant role in improving household financial wellbeing as well as stimulating small business activity and job creation (Cull, Ehrbeck, & Holle, 2014). For example, transaction accounts serve as a gateway to other financial services such as savings, credit, and insurance, all of which facilitate business start-ups and expansion, investments in education and health, financial shock management, and improve the overall quality of life (Lusardi & Mitchell, 2011; van Rooij, Lusardi, & Alessie, 2011; World Bank, 2019). Indeed, countries with more financially inclusive approaches tend to grow faster and reduce income inequality more rapidly (Beck, Demirguc-Kunt, & Levine, 2004).

Although great strides have been made towards financial inclusion, significant challenges still exist. Globally, approximately 1.7 billion

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adults (31% of adults) remain unbanked (i.e. without an account at a financial institution or through a mobile money provider), the majority of who live in developing countries (Demirguc-Kunt, Klapper, Singer, Ansar, & Hess, 2018). The Global Findex Data of 2017 indicated that two thirds of the unbanked claim not having enough money as the primary reason for not having an account. Other factors include cost and distance to financial institutions, lack of necessary documentation, and lack of trust in the financial system (Demirguc-Kunt et al., 2018). These factors mean that although individuals may potentially have access to financial services and be in proximity to financial institutions, they may still not be able to afford the available financial products, many of which are not necessarily designed to benefit low-income users, including young people in low-resource communities in sub-Saharan Africa (SSA).

This study examines both institutional-and individual-level factors associated with saving behaviors, specifically access and utilization of financial services among children and families living in poverty in HIV-impacted communities in southwestern Uganda. This study is important in two major ways: First, it contributes to the limited literature on savings determinants and overall asset accumulation among poverty-impacted vulnerable youth and families, specifically, those impacted by HIV in SSA. Second, as governments and programming in low-income countries, especially those in SSA, consider financial inclusion as a viable approach towards addressing poverty and fostering economic growth, it is important to understand the factors that impact access to and utilization of financial services. Hence, findings from this study may inform policy and programming efforts regarding addressing poverty and fostering economic growth through asset accumulation for young people living in poverty who tend to be financially excluded from mainstream services.

2. Literature review

2.1. Individual-level determinants of savings and asset accumulation

Individual-level factors affecting savings and asset accumulation have been explained by neoclassical economists, who emphasize income, consumption, and age/stages in life cycle (Modigliani & Ando, 2009), as well as behavioral economists, who focus on personality traits, including future orientation, self-control, and motives (Thaler, 1994). Neoclassical economists explain savings and consumption in terms of expected future income. Specifically, individuals (and households) are concerned about long-term consumption opportunities, and therefore use savings to address future income shocks, especially when income reduces due to age (Modigliani & Ando, 2009). Unfortunately, low-income households are more susceptible to income shocks— including death, healthcare costs, nontuition requirements and debt— all of which potentially depress savings (Morduch, 1995). Moreover, with irregular income, most families may not distinguish between income for saving and income for current consumption (Abdelkhalek, Arestoff, El, De Freitas, & Mage, 2010; Johansson, 1998; Kibet, Mutai, Ouma, Ouma, & Owuor, 2009; Lindqvist, 1981).

Beyond income, there are several individual characteristics that drive people to make certain financial decisions, including self-control, cognitive abilities, inertia, situational barriers, personality, and saving motives and goals (Beverly et al., 2008). Beverly et al. (2008) colleagues pointed to indicators associated with attitudes, including motivations to save, perceived ability to save, and future orientation. These indicators are premised on the notion that well-intentioned individuals will postpone their current consumption to prepare for the future. Research on psychological determinants of saving in childhood and adolescence has posited that both ability and willingness to save are important constructs that shape saving behaviors of children and adolescents (Katona, 1975; Otto, 2012). These studies, however, have focused on high-income countries where low-income individuals may have more opportunities to access and utilize financial services, compared to developing countries. As such, there is need to understand and document the individual-level factors associated with saving behaviors and asset accumulation, that are appropriate and relevant to developing economies, especially those in SSA.

2.2. Institutional-level determinants of savings and asset accumulation

Institutional theorists assert that low-income individuals and families are unable to save and accumulate assets primarily because they do not have the same institutional opportunities that higher-income households have, and therefore consider deliberately designed policies, programs, and products as opportunities, constraints, and consequences that shape behavior (Beverly & Sherraden, 1999; Beverly et al., 2008; Sherraden, 1991). Given this framework, institutional theorists argue that low-income families can save and accumulate assets if afforded the same access to institutional resources readily available to high- income families (Ssewamala & Sherraden, 2004). Institutional-level factors that influence saving and asset accumulation include access, information, incentives, facilitation, expectations, restrictions, and security (Barr & Sherraden, 2005; Beverly et al., 2008; Beverly & Sherraden, 1999; Sherraden, Schreiner, & Beverly, 2003; Sherraden, Williams Shanks, McBride, & Ssewamala, 2004). Studies have demonstrated that factors such as proximity to financial institutions, transactional costs, and opening fees have significant effects on whether an individual from a low-income household decides to open a bank account as well as the amount that the individual chooses to save (Dupas & Robinson, 2009; Kibet et al., 2009; Kiiza & Pederson, 2001). Other studies have found positive associations between access to information and engagement in saving behaviors. For example, Bernheim and Garrett (2003) found that employees were more likely to engage in an employer-sponsored savings program if they received information concerning retirement planning from their employers. In Uganda, access to banking information increased the likelihood of opening a bank account by 33% (Kiiza & Pederson, 2001). Similarly, proximity to financial institutions, financial education, and financial incentives were positively associated with higher savings performance (Chowa, Ansong, & Despard, 2014; Chowa, Masa, & Ansong, 2012). Taken together, findings from these studies suggest that individuals with limited resources can save and accumulate assets when institutional barriers to savings are removed.

2.3. Matched savings accounts for children and youth orphaned children

Children and youth, especially in developing countries, have limited access to financial services because of limited income, low levels of financial literacy, restrictions in the legal and regulatory environment, lack of access to appropriate financial products, and poor financial capabilities (Lusardi & Mitchell, 2011; Sykes, Elder, Gurbuzer, & Principi, 2016). Yet increasing youths' ability to access financial services and strengthening their ability to use these services may play a direct role in supporting their transition to employment and better livelihoods (Ssewamala, 2015). Relatedly, researchers have developed innovative ways to introduce children and youth (and their families) who would not have the opportunity otherwise to financial services. One such example is a child development account (CDA) that is opened in both the child and caregiver's names in an established financial institution and allows both the child's family and extended relatives to contribute to monthly deposits. The monthly deposits attract an incentivized match with funds up to a specific amount (match cap) matched by the program. The savings plus the match are used for specific purposes, including education and microenterprise development (Ssewamala, 2015).

Our previous studies in SSA have documented the positive economic, social, and psychosocial impacts of participating in matched savings programs. These impacts include improved mental health functioning for both children and caregivers (Han, Ssewamala, & Wang, 2013; Karimli, Ssewamala, Neilands, Wells, & Bermudez, 2019;

Ssewamala, Neilands, Waldfogel, & Ismayilova, 2012), savings (Wang et al., 2018), reduced intentions to engage in sexual risk-taking behavior (Ismayilova, Ssewamala, & Karimli, 2012; Ssewamala, Han, Neilands, Ismayilova, & Sperber, 2010; Ssewamala, Ismayilova, et al., 2010), better educational outcomes (Ssewamala et al., 2016; Ssewamala, Karimli, Han, & Ismayilova, 2010), and HIV risk and viral suppression (Bermudez et al., 2018; Ssewamala, Alicea, Bannon, & Ismayilova, 2008). Similar evidence can be found in other programs conducted in SSA, such as YouthSave and AssetsAfrica (Ansong et al., 2019; Chowa, Masa, & Sherraden, 2012; Masa, Chowa, & Sherraden, 2019). However, even with these positive outcomes, there is limited evidence on the determinants of savings and asset accumulation among children and families participating in matched savings accounts in SSA, including poverty and HIV-impacted children. One study that examined the variations in saving behaviors among children and families participating in CDA found that family demographics, including the age and type of caregiver and school enrollment of the child, were associated with children's saving behaviors (Karimli, Ssewamala, Neilands, & McKay, 2015). Yet overcoming the barriers that prevent vulnerable youth and families living in poverty from accessing and using financial services requires understanding and addressing the factors that hinder the process in the first place, both at the individual (including poverty) and institutional levels.

Thus, this study examines both institutional and individual factors associated with saving behaviors, specifically access and utilization of financial services among children and families living in poverty in HIV-impacted communities in southwestern Uganda. Given the premises of institutional theory, we hypothesize that compared to individual-level characteristics (e.g., age of participant, income/household poverty, family savings, child poverty, child work, and attitudes towards savings), institutional-level factors (e.g., access and proximity to banks, match rate, and level of financial education) will play a more pronounced role in influencing access and utilization of financial services.

3. Methods

3.1. Study site and data collection

This study uses data from the Bridges to the Future study (hereafter, Bridges study), a 5-year randomized controlled trial funded by the National Institute of Child Health and Human Development (NICHD, Grant #R01 HD070727). The Bridges study aimed to evaluate the impact of a family asset-based intervention that utilized CDAs on social, economic, and overall developmental outcomes of children and adolescents living in poverty and affected by HIV as well as their families. The study was conducted in 48 primary schools located across the geopolitical districts of Masaka, Rakai, Kyotera, Kalungu, and Lwengo in southern Uganda—the five districts hardest hit by HIV/AIDS (prevalence of 7.9% vs. 6.2% national average; Uganda Population-based, 2016). All the schools included in the study were public primary schools matched on socioeconomic status and academic performance. Adolescents 10–16 years of age (at intervention initiation) who met the following inclusion criteria were selected: (a) lost one or both parents to HIV/AIDS, (b) living within a family, not in an institution, and (c) enrolled in Primary 5 and 6 (equivalent to sixth and seventh grades in the U.S. educational system). From a total of 1410 potentially eligible HIV-orphaned adolescents, 27 were found to be ineligible. Thus, the final sample was 1383 adolescents. Survey data were collected among these adolescents using 90-min interviews administered by trained Uganda interviewers.

3.2. Study design and intervention

The Bridges intervention utilized a randomized control trial (RCT) design. Each of the 48 primary schools was randomly assigned to either the control arm (n = 16 schools, 487 adolescents) or one of the two treatment arms: Bridges arm (n = 16 schools, 396 adolescents) or Bridges Plus arm (n = 16 schools, 500 adolescents). Randomization was conducted at the school level to minimize cross-arm contamination. Adolescents in the control condition received "usual care" services for orphaned adolescents, including scholastic materials, food aid, and counseling services. Adolescents in the two treatment arms (Bridges arm and Bridges Plus arm) received the "usual care" services mentioned above, plus three3 intervention components:

1. A CDA held in both the child and caregiver's name in a well-established and recognized financial institution or bank registered by the Central Bank of Uganda. The adolescent's family and other relatives were allowed and indeed encouraged to contribute to the CDA. The accumulated savings in a CDA were matched with money from the program by a ratio of 1:1 for the Bridges arm or a 2:1 match ratio for the Bridges Plus arm. In other words, the only difference between the Bridges arm and the Bridges Plus arm was the match incentive rate. The match cap (the maximum amount of family contribution matched by the program) in both treatment arms was an equivalent of US$14 a month per family (US$336 for the 24-month intervention period). The savings and the match accumulated in the CDA were intended to pay for the adolescent's postprimary education and/or start a microenterprise business.
2. Microenterprise workshops provided to adolescents and their caregiving families focused on financial education, including savings, asset accumulation and development, and income generating activities or microenterprise development. The workshops were intended to promote economic stability for the families in the study and to enable the participating adolescent to continue in school with greater economic security.
3. A mentorship program, guided by a nine-session curriculum, intended to help adolescents develop the ability to identify specific future goals and educational aspirations through building their self-esteem, encouraging hopefulness, and building stronger communication skills with their caregivers. The 60-minute monthly sessions were conducted at the adolescents' respective schools for 9 months during the intervention period. The mentorship curriculum was developed and tested in two earlier NIH funded studies, the Suubi and Suubi-Maka studies (Ssewamala, Nabunya, Mukasa, Ilic, & Nattabi, 2014).

3.3. Sample data

Data in this study were drawn from baseline assessment as well as bank administrative data, i.e. monthly savings deposits and withdrawals obtained on quarterly basis from the participating financial institutions throughout and after the intervention period. Because verifiable bank administrative data were only available for adolescents in the treatment group, only participants in the Bridges arm (n = 396) and Bridges PLUS arm (n = 500) were considered for our analyses.

Out of 896 adolescents in the two treatment arms, 774 opened an account. The final sample size was 890 for analyzing account opening (six participants were excluded due to missing data) and 770 for analyzing saving performance (four observations were excluded from the analysis because of missing data).

3.4. Ethical considerations

Informed consent and assent were obtained separately from caregivers and adolescents, respectively, prior to study participation. The Bridges study received approval from the Columbia University Institutional Review Board (IRB-AAA11950) and the Uganda National Council of Science and Technology (SS2586). The study is registered in the Clinical Trials database (NCT01447615).

3.5. Measurements

All measurements in the present study were validated and tested in past studies (Karimli et al., 2015, 2019; Karimli, Ssewamala, & Neilands, 2014; Wang et al., 2018).

3.5.1. Saving outcomes

Participants' saving outcomes were measured by eight indicators: (a) *Account opening* was measured by a binary indicator (yes/no) of whether the child opened a bank account **or** not; (b) *Average monthly net deposit* was measured by the total net deposits divided by months an adolescent participated in the program (from the month the account was opened until the intervention period ended). We used inverse hyperbolic sine (IHS) transformation (Johnson, 1949), which is a useful transformation technique for wealth data to deal with skewness, retain zero and negative values, explore sensitive changes in the distribution, and avoid stacking and disproportionate misrepresentation (Burbidge, Magee, & Robb, 1988; Friedline, Masa, & Chowa, 2015); (c) *Average monthly total savings* (IHS transformed) were measured by total savings (net deposits plus matched money) divided by months participated in the program; (d) *Total number of deposits* were defined as the total number of deposits during the intervention (also indicated how often the participant utilized the CDA account); (e) *Total number of withdrawals* was defined as the total number of withdrawals during the intervention; (f) *Saved any money* (yes/no) was used to indicate whether the participant deposited any money over 2 years; (g) *Low utilization* (yes/no) was defined as whether the participant made fewer than two deposits over 2 years; and (h8) *Postintervention deposits* (yes/no) was indicated by whether the participant made any deposits after the intervention was concluded.

3.5.2. Institutional-level factors

Institutional-level factors were measured by the following: (a) *Bank proximity* was measured by a binary indicator of proximity to the nearest bank branch. This variable represents the access aspect of the institutional theory and has been previously used in the SSA settings as an important predictor of financial inclusion (Chowa et al., 2012, 2014). (b) *Institutional banking option* was measured by participants' institutional banking options where the CDA account was opened, i.e. Centenary Bank, Diamond Trust Bank, and Kakuuto Microfinance, indicating the access, and security aspects of the institutional construct. This measure was used by Karimli et al. (2015) that investigate saving performance among children participating in matched Child Savings Account program in Uganda. (c) *Treatment condition* indicates the intervention group the adolescents were assigned (Bridges arm or Bridges PLUS arm), which differed by match rate (1:1 vs 1:2 respectively) and captures the incentive aspect of the institutional construct. Numerous studies have used match rate as one of the key institutional characteristics, and it is hypothesized that a higher match rate is associated with greater participation and performance in the saving program (Curley, Ssewamala, & Sherraden, 2009; Han & Sherraden, 2008; Schreiner, 2001; Sherraden et al., 2003; Ssewamala & Sherraden, 2004; Wang et al., 2018). (d) *Financial education* was measured by two variables, recording the number of financial education sessions that the caregiver and the child attended. Research on evaluations of matched saving programs used this measure to indicate information aspect of the institutional construct, both in the U.S. (Curley et al., 2009; Grinstein-Weiss & Curley, 2003; Sherraden et al., 2003; Ssewamala & Sherraden, 2004), and in SSA (Chowa et al., 2012). We hypothesize that financial education makes participants more aware of their savings options and opportunities, thus the greater the number of financial education sessions attended, the greater the saving performance.

3.5.3. Individual-level factors

Baseline individual factors included the following: (a) *Household Wealth Index,* was adapted from the Demographic Health Survey (DHS), which was tested globally in more than 90 developing countries (Rutstein & Johnson, 2004; Rutstein, 2008); (b) *Child poverty* was measured by a composite score consisting of six binary variables: whether child had more than two sets of clothes, a blanket, at least two pairs of shoes, meat/fish at least once in the previous week, three meals per day in the previous seven days, and tea with sugar at least once in the previous 7 days. Items were adapted from DHS questionnaire and Uganda Bureau of Statistics' Household Survey (Uganda Bureau of Statistics, 2014). The score ranges from 0 to 6, with a higher score indicating more severe poverty status; (c) *Child work* was measured by a self-reported binary (yes/no) measure, indicating child's involvement in any paid work, either currently or in the last year; (d) *Attitudes toward savings*—measured in by importance of savings ($\alpha = 0.65$) and confidence in ability to save in the future ($\alpha = 0.74$). Importance of saving was assessed for six goals relating to education—starting a family business, vocational training, familial assistance, buying an animal for income generation, and moving into one's own home. Participants were asked to state the importance of each savings goal and how confident they were in their ability to save for each goal. Responses were rated on 5-point Likert-style scales (1 = not important/not confident and 5 = extremely important/extremely confident). Summary scores were created, with higher scores indicating greater attitudes toward savings, and (e) *Family saving* was measured by a binary variable based on whether the adolescents' parent(s) or guardian(s) were saving any money for the adolescent at the baseline.

3.5.4. Control variables

We controled for a variety of child demographic characteristics, including orphanhood status (single or double orphan), gender, age, primary caregiver (surviving biological parent/grandparents/other relatives), caregiver's employment (whether formally employed or not), household size (total number of people and children in the household), and length of stay in the current household.

3.6. Analytic methods

Univariate and bivariate analyses (t tests and chi-square analyses) were conducted to test differences in saving outcomes between the Bridges arm and Bridges Plus arm. Further, two-level hierarchical linear regression models (HLM) and hierarchical generalized linear model**s** (HGLM; Snijders & Bosker, 2012) were performed to correct the clustering effects of the school on saving outcomes among adolescents in two treatment arms. The intraclass correlation coefficient (ICC) of each outcome in the study are shown in Table 3. Although there is no agreement on the ICC cutoff for multilevel modeling, Lee (2000) suggested an ICC greater than 10% is big enough to consider multilevel methods. Other researchers indicated HLM should be considered if ICC is 0.25 or above (Guo, 2005; Heinrich & Lynn, 2001; Kreft, 1996). The outcome with the highest ICC was postintervention saving (ICC = 0.323), indicating that 32.3% of the variability of postintervention saving behavior was accounted for by interschool differences. The use of HLM and HGLM account for the within-school clustering effects, where multiple adolescents were nested within each school, so the estimates are unbiased.

Continuous outcomes (i.e. inverse hyperbolic transformed monthly saving amount) were estimated using linear mixed models, whereas binary outcomes (e.g. whether opened a savings account) were estimated using logistic generalized linear mixed models with the odds ratios reported to represent the change in the odds of the outcome per unit change in the predictor. Additionally, for count outcomes (e.g. total number of deposits and withdrawals), we applied multilevel negative binominal generalized linear models. We also considered alternative models of Poisson generalized linear models for count outcomes. However, we found for all the count outcomes in our study the assumption of overdispersion assumptions were violated (variances were greater than means, and likelihood ratio tests of alpha equals to zero

were all statistically significant at 0.05 level). Thus, we concluded that negative binominal generalized liner models were more suitable for estimating count outcomes in this study. Moreover, robust standard errors were utilized to correct for heteroskedasticity.

To compare the relative importance of individual factors and institutional factors on child's saving behaviors, likelihood ratio tests were utilized to assess joint effects of individual or institutional determinants of saving outcomes. Specifically, to assess the joint effect of individual factors, we first ran full multilevel models with all predictors, including demographic, individual, and institutional predictors, after which we left out all the individual predictors and ran reduced multilevel models with the rest of demographic and institutional predictors. Because two models are nested within each other, likelihood ratio tests were performed immediately after two models. The same procedures were followed to assess the joint effect of institutional factors. For all the likelihood ratio tests, results with $p < .05$ indicate that the joint effect of omitted factors were statistically significant. All the analyses were performed in Stata 15. Maximum likelihood estimation was used for each model to ensure comparability between different models through fit indices (i.e., Akaike information criterion [AIC] and Bayesian information criterion [BIC]; Luke, 2004). All models presented in this study were random-intercept models to achieve parsimony.

4. Results

4.1. Bivariate analyses

Sample characteristics are summarized in Table 1. No statistically significant differences were observed between participants in the control and both treatment conditions in terms of household wealth, savings by the parent/caregiver, attitudes towards savings (i.e. importance and confidence in savings). As shown in Table 2, 82% of participants in the Bridges arm and 90% of participants in the Bridges PLUS arm opened a bank account ($\chi^2 = 9.95$, $df = 1$, $p < .01$). Among participants who opened a bank account, 60% in the Bridges arm and 69% in the Bridges PLUS arm had saved any money ($\chi^2 = 6.62$, $df = 1$, $p < .01$). No statistical differences were observed regarding deposit and withdrawal instances, average monthly net deposit, and average monthly total savings (net savings plus matched money). The mean average monthly total savings for participants in the Bridges arm was 6712.15 UGX (equivalent of 2.5 USD) compared to 1618.89 UGX (equivalent of 0.6 USD) of the Bridges PLUS arm. Adolescents and caregivers in both treatment arms attended similar number of financial education sessions, with an average of 6.34 times (in the Bridges arm) and 6.47 times (in the Bridges PLUS arm) for adolescents and 5.37 times (in the Bridges arm) and 5.64 times (in the Bridges PLUS arm) for caregivers. Only 8% (n = 60) of adolescents in both treatment arms continued to make deposits after the intervention concluded.

4.2. Multilevel model results

Tables 3 and 4 (Model A through Model H) show multilevel results of institutional and individual factors associated with access and utilization of financial services. A description of each model is provided below.

4.2.1. Account opening and low utilization

In Model A, the number of financial education sessions attended by both the child and caregiver were significantly associated with opening an account. Specifically, each additional financial education session increased the odds of opening a bank account by 10.4% ($OR = 1.104$, 95% CI = 1.009, 1.208, $p < .05$) for a child, and 28.1% ($OR = 1.281$, 95% CI = 1.182, 1.389, $p < .001$) for a caregiver, holding all the other variables constant. Age was the only significant individual-level factor associated with account opening ($OR = 0.823$, 95% CI = 0.689, 0.982, $p < .05$). Regarding low utilization of bank accounts, i.e. whether the participant made less than two deposits over 2 years of the intervention (Model B), near proximity to the bank lowered the likelihood of low utilization by 65.6% ($OR = 0.344$, 95% CI = 0.122, 0.967, $p < .05$). However, participants who utilized Kakuuto Microfinance were 4 times more likely to have low utilization ($OR = 4.114$, 95% CI = 1.246, 13.582, $p < .05$) compared to participants who utilized Diamond Trust Bank (DTB). In addition, financial education sessions received by adolescents ($OR = 0.908$, 95% CI = 0.840, 0.981, $p < .05$) and by caregivers ($OR = 0.797$, 95% CI = 752, 0.844, $p < .001$) were associated with lower odds of low utilization. Participants in the Bridges PLUS arm were 72.5% less likely to have low utilization compared to participants in the Bridges arm ($OR = 0.275$, 95% CI = 0.112, 0.677, $p < .01$). In addition, gender was the only individual-level factor significantly associated with low utilization ($OR = 0.640$, 95% CI = 0.458, 0.895, $p < .01$).

Table 1
Descriptive demographic characteristics at baseline.

	Control (N = 487)		Bridges (N = 396)		Bridges Plus (N = 500)		Total (N = 1383)		
	Mean (%)	SD	Mean (%)	SD	Mean (%)	SD	Mean (%)	SD	F-Value or χ2
Age	12.75	1.23	12.56	1.31	12.71	1.25	12.68	1.26	2.76
Female	0.55		0.57		0.56		0.56		0.29
Household size	6.43	2.97	6.29	2.62	6.32	2.74	6.35	2.79	0.30
Number of children in the household	3.18	2.32	3.14	2.08	3.23	2.18	3.19	2.20	0.17
Years living in the household	7.11	4.40	7.20	4.43	7.44	4.54	7.26	4.46	0.73
Double orphan	0.23		0.16		0.19		0.20		6.25*
Primary caregiver									7.38
Parents	0.35		0.40		0.43		0.39		
Grandparents	0.40		0.35		0.36		0.37		
Other relatives	0.25		0.26		0.22		0.24		
Caregiver employed	0.31		0.34		0.24		0.29		10.59**
Asset index	13.86	3.62	13.73	3.87	13.85	3.83	13.82	3.76	0.14
Poverty index	9.66	3.22	10.08	3.36	9.87	3.24	9.85	3.27	1.80
Child currently working for pay/engaged in work last year	0.27		0.27		0.32		0.29		4.79
Parent/guardian saving money for child	0.35		0.38		0.37		0.37		0.62
Saving importance	27.50	2.79	27.23	3.06	27.13	2.74	27.29	2.85	2.13
Saving confidence	26.00	4.16	25.63	4.58	25.64	4.39	25.76	4.37	1.08

Notes: † p < .1; *p < .05; **p < .01; ***p < .001.
Results show that adolescents in the control group are more likely to be double orphans at baseline than adolescents in two treatment arms. In addition, caregivers in the Bridges PLUS were less likely to be employed compared to control group.

Table 2
Descriptive saving outcome characteristics.

Administrative savings data	Bridges		Bridges PLUS		Total		
	Mean (%)	SD	Mean (%)	SD	Mean (%)	SD	T-Value or $\chi 2$
Among all children	N = 396		N = 500		N = 896		
Opened a bank account	0.82		0.90		0.86	0.34	9.95**
Saved any money in the bank account	0.49		0.62		0.56		13.70***
Number of deposits	2.07	4.33	2.58	3.87	2.36	4.08	−1.83†
Number of withdrawals	0.27	1.07	0.28	0.79	0.27	0.92	−0.26
Average monthly net deposit (UGX)	845.52	6699.20	110.27	530.97	435.23	4483.05	2.18*
Average monthly total savings (UGX)	5525.66	64596.70	1450.53	2802.46	3251.59	43012.52	1.25
# of financial education session attended, child	5.82	3.41	6.17	3.16	6.02	3.28	−1.57
# of financial education session attended, caregiver	4.85	3.27	5.31	3.24	5.11	3.26	−2.09*
Among children who opened a bank account	N = 326		N = 448		N = 774		
Saved any money in the bank account	0.60		0.69		0.65		6.62*
Number of deposits	2.52	4.66	2.88	3.98	2.73	4.28	−1.14
Number of withdrawals	0.32	1.17	0.31	0.83	0.32	0.99	0.10
Average monthly net deposit (UGX)	1027.08	7372.82	123.07	559.60	503.83	4820.28	2.21*
Average monthly total savings (UGX)	6712.15	71158.19	1618.89	2914.49	3764.11	46261.61	1.29
# of financial education session attended, child	6.34	3.11	6.47	2.99	6.42	3.04	−0.61
# of financial education session attended, caregiver	5.37	3.09	5.64	3.13	5.53	3.11	−1.19
Continued to deposit after intervention	0.08		0.08		0.08		0.04
Average deposit instances after intervention	0.40	1.77	0.27	1.50	0.33	1.62	1.09

Notes: † p < .1; *p < .05; **p < .01; ***p < .001.
1 USD = 2682.06 UGX in 2012.

4.2.2. Saving money during and after the intervention

As presented in Model C, participants with bank accounts in Kakuuto Microfinance had lower odds of saving any money (*OR* = 0.137, 95% CI = 0.032, 592, $p < .01$), relative to participants in Centenary Bank. However, each additional financial education session received by the caregiver was associated with higher odds of saving any money (*OR* = 1.213, 95% CI = 1.131, 1.301, $p < .001$). Among individual factors, higher Wealth Index score was associated with greater odds of saving any money (*OR* = 1.084, 95% CI = 1.029, 1.142, $p < .01$). In addition, having a grandparent as the primary caregiver was associated with lower odds of saving any money (*OR* = 0.542, 95% CI = 0.304, 0.966, $p < .05$), relative to biological parent as the primary caregiver. In terms of postintervention saving predictors (Model D), bank proximity (*OR* = 3.605, 95% CI = 1.032, 12.593, $p < .05$) and increased number of financial education session received by the caregiver (*OR* = 1.182, 95% CI = 1.068, 1.308, $p < .01$) were both associated with greater odds of postintervention savings. However, participants who utilized Kakuuto Microfinance were 89.1% less likely to have postintervention savings (*OR* = 0.109, 95% CI = 035, 0.342, $p < .001$). Household size was the only individual factor significantly associated with postintervention saving behaviors (*OR* = 0.693, 95% CI = 0.547, 0.877, $p < .01$).

4.2.3. Average monthly total savings and average monthly net deposit

In Model E, compared to participants who opened accounts at Centenary Bank, participants who utilized Kakuuto microfinance had 2.47 units decreased amount of total savings (B = −2.468, 95% CI = −3.615, −1.322, $p < .001$). In addition, both financial education for adolescents (B = 0.104, 95% CI = 0.027, 0.181, $p < .01$) and caregiver (B = 0.290, 95% CI = 0.213, 0.368, $p < .001$) were significantly associated with increased average monthly total savings. Household wealth (B = 0.110, 95% CI = 0.055, 0.165, $p < .001$) and child work (B = −0.564, 95% CI = −1.006, −0.123, $p < .05$) were significantly associated with lower average total monthly savings. Specifically, participants with low levels of household assets and those who reported engaging in work for pay were more likely to have lower average savings. Moreover, compared to biological parents, participants with grandparents (B = −0.732, 95% CI = −1.410, −0.054, $p < .05$) and other relatives (B = −0.767, 95% CI = −1.515, −0.018, $p < .05$) were more likely to report lower average monthly total savings. Regarding average monthly net deposit (Model F), financial education sessions attended by adolescents was positively associated with average monthly net deposit (B = 0.086, 95% CI = 0.007, 0.166, $p < .05$). Identifying as a double orphaned child was associated with lower monthly average net deposit (B = −0.496, 95% CI = −0.800, −0.193, $p < .05$) compared to single orphans.

4.2.4. Total number of deposits and withdrawals

In Model G, all institutional factors significantly predicted total number of deposits. Specifically, having a bank nearby was associated with increased number of withdrawals (IRR = 2.643, 95% CI = 1.233, 5.665, $p < .05$). Owning an account in DTB Bank (IRR = 0.675, 95% CI = 0.483, 0.943, $p < .05$) or Kakuuto microfinance (IRR = 0.202, 95% CI = 0.056, 0.736, $p < .05$) were associated with a decrease in the number of total monthly deposits. In addition, financial education session received by the child (IRR = 1.049, 95% CI = 1.016, 1.083, $p < .01$) or by the caregiver (IRR = 1.136, 95% CI = 1.099, 1.173, $p < .001$) were associated with an increase in total deposit. Finally, the match rate of 1:2 (Bridges PLUS arm) was associated with an increase in total number of deposits (IRR = 2.464, 95% CI = 1.122, 5.410, $p < .05$) compared to the 1:1 match rate for the Bridges arm. Among the individual factors, being female (IRR = 1.255, 95% CI = 1.005, 1.567, $p < .05$), Wealth Index (IRR = 1.033, 95% CI = 1.002, 1.065), and being double orphaned (IRR = 0.715, 95% CI = 0.551, 0.927, $p < .05$) were significantly associated with increase in total number of deposits.

Similarly, predictors associated with positive saving outcomes were also associated with more withdrawals. In Model H, near access to the bank (IRR = 2.413, 95% CI = 1.197, 4.866, $p < .05$) and financial education session attended by the caregiver (IRR = 1.078, 95% CI = 1.003, 1.159, $p < .05$) were both associated with increased number of total withdrawals. Among all the individual characteristics, household wealth (IRR = 1.066, 95% CI = 1.007, 1.128, $p < .05$), age (IRR = 1.175, 95% CI = 1.006, 1.373, $p < .05$), female (IRR = 1.498, 95% CI = 1.087, 2.064, $p < .05$), and having other relatives as caregiver (IRR = 0.516, 95% CI = 0.276, 0.965, $p < .05$) were significantly associated with total number of withdrawals.

4.2.5. Joint effects of individual and institutional factors

As shown in Table 5, the joint effects of institutional factors were statistically significant at 0.05 level across all eight indicators of access and utilization of financial services (i.e. account opening, low

Table 3
Multilevel regressions for account opening, utilization and saving before and after the intervention.

	Model A Opened an account (Multilevel logistic) Odds ratio [95% CI]	Model B Low utilization (Multilevel logistic) Odds ratio [95% CI]	Model C Saved any money (Multilevel logistic) Odds ratio [95% CI]	Model D Postintervention saving (Multilevel logistic) Odds ratio [95% CI]
Fixed effects				
Bank proximity (Ref. Far)				
Near	0.872 [0.467, 1.626]	0.344 [0.122, 0.967]*	2.542 [0.773, 8.362]	3.605 [1.032, 12.593]*
Institutional banking option (Ref. Cetenary bank)				
DTB Bank	–	1.218 [0.670, 2.212]	0.863 [0.341, 2.187]	1.616 [0.633, 4.127]
Kakuuto Microfinance	–	4.114 [1.246, 13.582]*	0.137 [0.032, 0.592]**	0.109 [0.035, 0.342]***
# of financial education session attended-child	1.104 [1.009, 1.208]*	0.908 [0.840, 0.981]*	1.072 [0.995, 1.156]†	1.011 [0.889, 1.150]
# of financial education session attended-caregiver	1.281 [1.182, 1.389]***	0.797 [0.752, 0.844]***	1.213 [1.131, 1.301]***	1.182 [1.068, 1.308]**
Treatment arm (Ref. Bridges)				
Bridges PLUS	1.741 [0.998, 3.039]†	0.275 [0.112, 0.677]**	2.767 [0.950, 8.061]†	1.624 [0.558, 4.730]
Wealth index	0.965 [0.894, 1.041]	0.940 [0.882, 1.003]†	1.084 [1.029, 1.142]**	1.074 [0.972, 1.187]
Poverty index	0.994 [0.917, 1.078]	0.995 [0.937, 1.057]	0.991 [0.921, 1.066]	1.036 [0.929, 1.155]
Child work this year/last year (Ref. No)				
Yes	1.383 [0.769, 2.489]	1.114 [0.740, 1.676]	0.663 [0.475, 0.926]*	1.001 [0.507, 1.979]
Family saving money for the child (Ref. No)				
Yes	1.103 [0.769, 1.581]	1.349 [0.856, 2.125]	0.848 [0.647, 1.112]	0.732 [0.340, 1.576]
Saving importance scale	1.077 [0.981, 1.183]	1.031 [0.951, 1.118]	1.025 [0.939, 1.117]	0.963 [0.877, 1.059]
Saving confidence scale	0.946 [0.893, 1.001]†	1.011 [0.965, 1.059]	0.972 [0.931, 1.014]	0.980 [0.923, 1.040]
Age	0.823 [0.689, 0.982]*	0.987 [0.858, 1.136]	1.070 [0.922, 1.243]	1.103 [0.820, 1.484]
Gender (Ref. Male)				
Female	1.062 [0.682, 1.651]	0.640 [0.458, 0.895]**	1.059 [0.745, 1.504]	1.363 [0.918, 2.024]
Household size	1.167 [0.861, 1.582]	0.989 [0.831, 1.177]	0.879 [0.771, 1.001]†	0.693 [0.547, 0.877]**
# of children in the household	0.846 [0.608, 1.178]	1.074 [0.874, 1.320]	1.087 [0.893, 1.323]	1.115 [0.859, 1.447]
Orphanhood status (Ref. Single orphaned)				
Double orphaned	0.994 [0.511, 1.935]	1.402 [0.764, 2.570]	1.085 [0.568, 2.075]	0.397 [0.084, 1.871]
Primary caregiver (Ref. Parent)				
Grandparents	0.826 [0.476, 1.431]	1.576 [0.999, 2.485]†	0.542 [0.304, 0.966]*	0.996 [0.382, 2.596]
Other relatives	1.151 [0.631, 2.103]	1.603 [0.930, 2.764]†	0.584 [0.306, 1.115]	0.528 [0.168, 1.661]
Caregiver employed (Ref. No)				
Yes	1.204 [0.691, 2.097]	0.902 [0.554, 1.469]	1.624 [0.999, 2.641]†	1.283 [0.512, 3.216]
Years living in the household	1.002 [0.955, 1.051]	1.015 [0.973, 1.059]	1.025 [0.976, 1.077]	1.016 [0.902, 1.144]
Constant	8.304 [0.471, 146.407]	31.162 [3.348, 290.050]**	0.100 [0.011, 0.937]*	0.016 [0.000, 2.637]
Observations	890	770	770	770
Model fit information				
Intraclass correlation	0.132	0.287	0.304	0.323
Log Likelihood	−284.722	−378.906	−380.898	−167.561
AIC	611.445	803.812	807.796	381.121
BIC	712.060	910.679	914.663	487.988

Notes: † p < .1; *p < .05; **p < .01; ***p < .001.

utilization, saved any money during the intervention, postintervention saving, average monthly total savings, average monthly net savings, total number of deposits, and total number of withdrawals). By contrast, the joint effects of individual factors were only statistically significant for saving any money, average monthly total savings, and total number of deposits.

5. Discussion

This study examined both institutional- and individual-level factors associated with access and utilization of financial services among poor HIV-impacted adolescents and their caregiving families in southwestern Uganda. Given the theoretical framework guiding this study: institutional theory, we hypothesized that compared to individual-level characteristics (e.g., household wealth, child poverty, child work, and attitudes towards saving money), institutional-level factors (e.g., access and proximity to the bank, match rate, and financial education) would play a more pronounced role in influencing access and utilization of financial services. Our results fully support this hypothesis. Specifically, individual-level factors were significantly associated with three of the eight outcomes, whereas institutional-level factors were associated with all the eight outcomes included in the analysis.

Specifically, what factors predict the observable outcomes: First, individual-factors—gender, orphanhood type, primary caregiver type, and household size—were all associated with utilization of access and utilization of financial services. More specifically, female participants had significantly better saving performance (including lower likelihood of low utilization and more deposits); increased household size was negatively and significantly associated with postintervention saving behavior; and we found low saving outcomes among double orphaned adolescents and those living with other extended family members compared to single orphans and those living with a surviving biological parent.

These findings are consistent with previous evidence that found increased household size to be a barrier to savings and asset accumulation (Steiner, Giesbert, & Bendig, 2009). In addition, findings related to orphanhood status and primary caregiver type could be explained by biological relatedness. For example, research has documented differential treatment of orphans based on biological relatedness, in which caregivers are inclined to give more love, attention and support—in this case, engage in savings—to their biological children. (Goldberg & Short, 2012; Parker & Short, 2009; Roby, Erickson, & Nagaishi, 2016). These findings are also in line with our previous findings, which documented the impact of these factors on saving behaviors among CDA participants

Table 4
Multilevel regressions for monthly savings, total deposit and withdrawal instances.

	Model E ihs(monthly net deposit + matched savings) (Multilevel linear) Beta-coefficients [95% CI]	Model F ihs(monthly net deposit only) (Multilevel linear) Beta-coefficients [95% CI]	Model G Total number of deposits (Multilevel negative binominal) Incidence rate ratio [95% CI]	Model H Total number of withdrawals (Multilevel negative binominal) Incidence rate ratio [95% CI]
Fixed effects				
Bank proximity (Ref. Far)				
Near	1.255[−0.198, 2.707]†	0.122 [−0.555, 0.799]	2.643 [1.233, 5.665]*	2.413 [1.197, 4.866]*
Institutional banking option (Ref. Centenary bank)				
DTB Bank	−0.525 [−1.543, 0.494]	0.016[−0.681, 0.714]	0.675 [0.483, 0.943]*	0.775 [0.531, 1.131]
Kakuuto Microfinance	−2.468 [−3.615, −1.322]***	−0.396 [−0.819, 0.026]†	0.202 [0.056, 0.736]*	0.620 [0.235, 1.636]
# of financial education session attended-child	0.104 [0.027, 0.181]**	0.086 [0.007, 0.166]*	1.049 [1.016, 1.083]**	1.083 [0.986, 1.189]†
# of financial education session attended-caregiver	0.290 [0.213, 0.368]***	0.042 [−0.012, 0.096]	1.136 [1.099, 1.173]***	1.078 [1.003, 1.159]*
Treatment arm (Ref. Bridges)				
Bridges PLUS	1.224 [−0.125, 2.574]†	−0.193 [−0.853, 0.468]	2.464 [1.122, 5.410]*	1.634 [0.859, 3.110]
Wealth index	0.110 [0.055, 0.165]***	0.034 [−0.024, 0.091]	1.033 [1.002, 1.065]*	1.066 [1.007, 1.128]*
Poverty index	−0.002 [−0.091, 0.088]	−0.009 [−0.057, 0.040]	1.007 [0.974, 1.040]	0.973 [0.900, 1.051]
Child work this year/last year (Ref. No)				
Yes	−0.564 [−1.006, −0.123]*	−0.028 [−0.375, 0.320]	0.904 [0.712, 1.147]	1.205 [0.726, 2.001]
Family saving money for the child (Ref. No)				
Yes	−0.242 [−0.627, 0.143]	−0.346 [−0.767, 0.075]†	0.826 [0.650, 1.048]	0.663 [0.427, 1.029]†
Saving importance scale	0.010 [−0.091, 0.111]	0.006 [−0.081, 0.093]	1.007 [0.969, 1.046]	1.043 [0.968, 1.124]
Saving confidence scale	−0.029 [−0.084, 0.026]	−0.009 [−0.051, 0.033]	0.985 [0.958, 1.013]	0.974 [0.926, 1.023]
Age	0.135 [−0.041, 0.311]	0.125 [−0.041, 0.291]†	1.045 [0.959, 1.139]	1.175 [1.006, 1.373]*
Gender (Ref. Male)				
Female	0.181 [−0.264, 0.625]	0.304 [−0.092, 0.700]	1.255 [1.005, 1.567]*	1.498 [1.087, 2.064]*
Household size	−0.166 [−0.337, 0.005]†	−0.020 [−0.149, 0.109]	0.977 [0.901, 1.059]	0.903 [0.748, 1.091]
# of children in the household	0.070 [−0.179, 0.319]	−0.065 [−0.217, 0.087]	0.989 [0.899, 1.088]	1.003 [0.803, 1.253]
Orphanhood status (Ref. Single orphaned)				
Double orphaned	−0.118 [−0.878, 0.643]	−0.496 [−0.800, −0.193]**	0.715 [0.551, 0.927]*	0.656 [0.342, 1.259]
Primary caregiver (Ref. Parent)				
Grandparents	−0.732 [−1.410, −0.054]*	−0.180 [−0.663, 0.304]	0.849 [0.674, 1.068]	0.775 [0.463, 1.298]
Other relatives	−0.767 [−1.515, −0.018]*	0.222 [−0.270, 0.714]	0.900 [0.680, 1.191]	0.516 [0.276, 0.965]*
Caregiver employed (Ref. No)				
Yes	0.525 [−0.141, 1.190]	0.168 [−0.256, 0.591]	1.183 [0.901, 1.553]	1.421 [0.834, 2.422]
Years living in the household	0.021 [−0.029, 0.072]	−0.004 [−0.042, 0.033]	1.010 [0.991, 1.030]	0.982 [0.944, 1.020]
Constant	0.564 [−2.419, 3.548]	−1.286 [−4.804, 2.232]	0.187 [0.046, 0.758]*	0.004 [0.000, 0.093]***
Observations	770	770	770	770
Model fit information				
Intraclass correlation	0.251	0.112	–	–
Log Likelihood	−1989.060	−1751.265	−1489.125	−476.422
AIC	4026.121	3550.529	3026.250	1000.843
BIC	4137.634	3662.042	3137.763	1112.357

Notes: † p < .1; *p < .05; **p < .01; ***p < .001.

(Karimli et al., 2015). Similarly, with limited economic resources, extended families might decide to utilize family resources for other immediate needs rather than saving money in a CDA. Indeed, Foster and Williamson (2000) documented that extended families in SSA are overwhelmed by the number of children orphaned by HIV and AIDS and have limited capacity and resources to accept more orphans. Thus, even with incentives to save, families with more adults and orphaned children in the household may not be able to afford to raise enough resources for saving (Foster & Williamson, 2000).

Second, no associations between Poverty Index and saving performance were observed. However, multiple family members were encouraged to contribute to the CDA. Therefore, regardless of Poverty

Table 5
Likelihood ratio test of joint effects.

Saving outcome	Joint effects of individual factors	Joint effects of institutional factors
Opened an account	LR $\chi2$ (6) = 6.23	LR $\chi2$ (4) = 89.54***
Low utilization	LR $\chi2$ (6) = 9.03	LR $\chi2$ (6) = 83.63***
Saved any money	LR $\chi2$(6) = 13.01*	LR $\chi2$(6) = 69.23***
Postintervention saving	LR $\chi2$(6) = 6.09	LR $\chi2$ (6) = 18.50**
Average monthly total savings	LR $\chi2$(6) = 17.51**	LR $\chi2$(6) = 93.95***
Average monthly net savings	LR $\chi2$(6) = 5.36	LR $\chi2$(6) = 17.04**
Total number of deposits	LR $\chi2$ (6) = 14.19*	LR $\chi2$ (6) = 112.44***
Total number of withdrawals	LR $\chi2$ (6) = 9.29	LR $\chi2$ (6) = 20.69**

Notes: *p < .05; **p < .01; ***p < .001.

Index, we anticipated that adolescents' savings may have come from multiple sources. On the other hand, we found mixed results regarding the relationships between household wealth and saving outcomes. For instance, household wealth was positively associated with saving any money and total number of deposits but was significantly associated with more withdrawals. One plausible explanation for this paradox could be that households with more wealth had alternative saving opportunities outside of the intervention. Specifically, we recognize that some caregivers already owned an account in a commercial bank and/or belonged to a village savings and loans group.

Third, we found that caregiver employment was associated with higher monthly total savings. This finding is consistent with other studies (Chowa et al., 2012; Kiiza & Pederson, 2001). By contrast, child work was associated with significantly less average monthly total savings and lower odds of saving any money. Indeed, although participants reported positive attitudes towards saving and higher levels of confidence in their saving abilities, we did not establish any associations between saving attitudes and saving performance, further pointing to the limited role of adolescents (compared to caregivers) in saving performance.

Fourth, in assessing the relationship between institutional factors and saving outcomes, our results revealed that families living in poverty had interactions with mainstream financial institutions if institutional-level opportunities were available. Specifically, geographical distance to the bank mattered in terms of account utilization, postintervention saving behaviors, total number of deposits, and total number of withdrawals. Additionally, consistent associations were observed between level of financial education received by caregiver and adolescents and saving performance indicators. These findings may reflect the importance of providing financial literacy training to poor families (Chemonics International, 2007).

Fifth, our findings also indicate that banking options (microfinance vs bank) for participants was a significant predictor for access and utilization of services. For example, Kakuuto Microfinance had much worse saving outcomes compared to DTB and Centenary Bank. One explanation could be that although all three institutions were regulated by the Central Bank of Uganda, Kakuuto Microfinance was a deposit taking institution, serving a poorer population in a small area, with a shorter operating period. On the other hand, Centenary Bank and DTB had been in operation for longer periods, with fully fledged financial products and multiple locations, including ATM access. It could be that participants (and their families) felt more comfortable engaging with and utilizing these banks as opposed to Kakuuto Microfinance. This finding is also consistent with previous evidence that suggests that in well-developed financial systems, traditional financial institutions tend to outcompete microfinance institutions—which tend to serve high poverty areas where well-developed financial systems are scarce (Cull, Demirgüç-Kunt, & Morduch, 2014; Vanroose & D'Espallier, 2013).

Sixth, the consistent pattern of significant joint effect of multiple institutional factors shows that adolescents and families affected by HIV/AIDS can save, especially when opportunities and institutional arrangements are in place. Our results show that institutional joint effect was significant across all eight outcome indicators. These findings point to the important role of institutional factors in shaping vulnerable families' saving behaviors. This finding is consistent with institutional theory-related literature (Chowa et al., 2012; Chowa et al., 2014; Curley et al., 2009; Han & Sherraden, 2009; Sherraden et al., 2003; Ssewamala & Sherraden, 2004).

Finally, our study continued to collect bank administrative data after conclusion of the intervention, thus we add evidence to the existing literatures on the extent to which participation in subsidized matched savings accounts programs increases the use of formal financial institutions in Uganda—8% of participants continued to save after the conclusion of the intervention in the absence of incentives or matching funds. Having and continuing to use a savings account, is an important indication of financial inclusion. According to Demirguc-Kunt et al. (2018), only 59% of people aged 15 and above have accounts in formal financial institutions in Uganda. Future programs and research should consider addressing sustainability of such asset building policies and programs. For example, one may consider adding postintervention financial education booster sessions after the intervention to encourage participant to keep utilizing such financial services to achieve long-term financial inclusion.

Taken together, these findings point to important implications for the existing theories, as well as programming and policy on saving actions and asset accumulation. For theoretical implications, findings challenge the conventional wisdom based off theories that focus on individuals (i.e. neoclassical economic, psychological, sociological, and behavioral economics theories) that low-income individuals and households have difficulty in saving because of individual factors such as limited income, basic consumption, low levels of financial literacy, unwillingness to save, lack of saving motives and goals, etc. Findings suggest that poor HIV-impacted families can save for their children, when given appropriate institutional opportunities. Moreover, institutional-level factors play a more pronounced role in shaping their access and utilization of financial services. Further, unlike the other theoretical perspectives that may have limited practical implications for adolescents and families affected by poverty and HIV, institutional theory of saving can directly inform future programming and policy. Specifically, as developing countries, especially those in SSA, continue to advance financial inclusion programing for populations, including youth, with less access to financial services, there is need to invest in and strengthen institutional-level opportunities, including financial education, proximity to banks, incentivizing access and utilization, in addition to modifying regulations.

6. Limitations and conclusions

Three limitations are worth noting. First, our sample included adolescents in schools who were impacted by HIV. Results may be different for nonorphaned adolescents or adolescents who are out of school. Second, the study was conducted in rural and semi urban settings in Uganda. The intervention may yield different results in urban settings. Third, given that the intervention had three different components (i.e. CDA, mentorship, and workshops on microenterprise development), it is not possible to tease out the net impact of each component on access and utilization of financial services. Future interventions should consider varying the intervention components in order to tease out the specific impact of each.

Despite these limitations, our study is among the first to examine both individual- and institutional-level factors associated with access and utilization of financial services, with a large sample of poor adolescents impacted by HIV and their families in SSA. Our findings confirm that financially vulnerable households can and do save with appropriate institutional arrangements, even in the absence of incentives or matching funds. Thus, having and continuing to use a savings account is an indication of financial inclusion. Additionally, our findings have implications for financial inclusion programming that targets vulnerable youth and households, such as those impacted by HIV in SSA. More specifically, to reach these groups, programs need to incorporate support services, including financial education and literacy and incentives to promote access and utilization of financial services. Moreover, for such programming to succeed, access to banking services, including proximity to financial institutions needs to be taken under consideration.

CRediT authorship contribution statement

Sicong Sun: Conceptualization, Methodology, Formal analysis, Writing - original draft. **Proscovia Nabunya:** Conceptualization, Writing - original draft, Writing - review & editing. **William Byansi:** Writing - original draft, Writing - review & editing. **Ozge Sensoy**

Bahar: Writing - review & editing. **Christopher Damulira:** Data curation, Project administration. **Torsten B. Neilands:** Methodology. **Shenyang Guo:** Methodology. **Flavia Namuwonge:** Project administration. **Fred M. Ssewamala:** Funding acquisition, Conceptualization, Writing - review & editing.

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Declaration of Competing Interest

The authors declare that they have no conflict of interest.

Human participant protection

The study was approved by Columbia University Institutional Review Board and Uganda National Council for Science and Technology. The study protocol is registered in the Clinicaltrial.gov database (ID # NCT01447615).

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